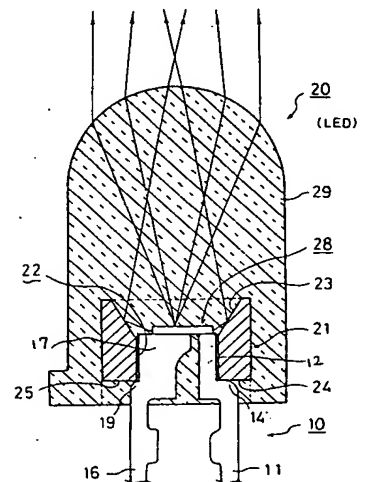


(54) LIGHT-EMITTING DIODE

(11) 4-10670 (A) (43) 14.1.1992 (19) JP
 (21) Appl. No. 2-114194 (22) 27.4.1990
 (71) TOYODA GOSEI CO LTD(1) (72) KATSUhide MANABE(2)
 (51) Int. Cl⁵. H01L33/00

PURPOSE: To obtain an LED whose takeout efficiency is good by using a reflection member which has been resin-molded to a lead frame which has omitted a drawing working operation and whose shape is simple by a method wherein a nearly conical reflection face which reflects light radiated from a light-emitting chip forward and a long hole which has been opened on the opposite side from the bottom continued to the reflection face are molded in the reflection member and the light-emitting chip and one part of the reflection member are sealed with a resin.

CONSTITUTION: A reflection member 21 is provided with a long hole 22 which is fitted to the width and the thickness of tip parts 12, 17 of lead members 11, 16; reflection faces 23 which have been inclined to the outside from its circumference are formed at one end part of the long hole 22. Abutment faces 24, 25 on stepped parts 14, 19 of the lead members 11, 16 are formed at the other end part of the long hole 22. The tip parts 12, 17 of the lead members 11, 16 are inserted into the long hole 22 of the reflection member 21 which has been molded in this manner; a light-emitting chip 28 is bonded to flat parts 13, 18 of the lead members 11, 16; after that, a lens member 29 is molded out of a transparent resin such as an epoxy resin or the like so as to surround the whole circumference of the reflection member 21; an LED 20 is formed.



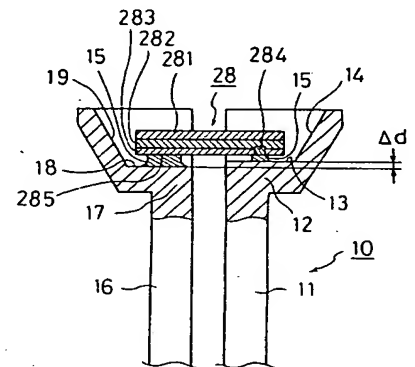
10: lead frame

(54) LIGHT-EMITTING DIODE

(11) 4-10671 (A) (43) 14.1.1992 (19) JP
 (21) Appl. No. 2-114196 (22) 27.4.1990
 (71) TOYODA GOSEI CO LTD(1) (72) KATSUhide MANABE(3)
 (51) Int. Cl⁵. H01L33/00, H01L21/321

PURPOSE: To eliminate the inclination of an optical axis of light radiated from a light-emitting chip by a method wherein two lead member where flat parts on which the light-emitting chip is mounted and bonded by a solder bump are provided and the height of the flat parts of the two lead members is made different.

CONSTITUTION: Since an electrode part 284 of an n-GaN layer 282 for a light-emitting chip 28 is formed by utilizing the inside of a hole made in one part of an n-GaN layer 283; it is not possible to make its size as large as an electrode part 285 of the i-GaN layer 283. When solder bumps 15 are formed at the electrode parts 284, 285, the difference Δd in a height between the solder bumps is caused in proportion to the area ratio of the electrode area of the i-GaN layer to the electrode area of the n-GaN layer. When the difference in a level of the nearly same size is formed at flat parts 13, 18 of lead members 11, 16 so as to correspond to the difference Δd in the height between the bumps, light radiated from the surface of the bonded light-emitting chip 28 is in the designed optical-axis direction decided by the flat parts 13, 18 of the lead members 11, 16 and is stabilized.

**(54) LIGHT-EMITTING DIODE**

(11) 4-10672 (A) (43) 14.1.1992 (19) JP
 (21) Appl. No. 2-114197 (22) 27.4.1990
 (71) TOYODA GOSEI CO LTD(1) (72) HISAYOSHI KATO(3)
 (51) Int. Cl⁵. H01L33/00, H01L23/29, H01L23/31

PURPOSE: To restrain a wavelength component which is longer than a wavelength of 490nm by mixing a yellowing-preventive agent with a resin-sealing member.

CONSTITUTION: A yellowing-preventive agent is mixed with an epoxy resin used to mold a lens member 19. At a light-emitting diode whose mixture ratio of the yellowing-preventive agent is at 0.5%, the degree of a blue color is increased remarkably in an emitted light color recognized by human eyes. At a light-emitting diode whose mixture ratio of the yellowing-preventive agent is at 2.5%, the degree of the blue color is also increased remarkably in the emitted light color recognized by the human eyes. When the yellowing-preventive agent is mixed in this manner, it is possible to reduce a wavelength component which is longer than 490nm.

